

# SAE HADD J826 3D CAD H-Point Manikin GTR-7 Update

*Sept. 17, 2010*

*SAE HADD Committee  
Dr. Lawrence Smythe - Chair*

# Outline of Presentation

- Objectives for Creating SAE 3D CAD Oscar
  - Answers to Questions From GTR-7 Members
  - Relevant SAE J826 Manikin History
  - Control Points for SAE J826 3D CAD Model
  - Decisions made to Model SAE J826 3D CAD
- Comparison to Scans & VDA model
- Results
- Recommendations

# Objectives for Creating SAE 3D CAD HMP-I Model

- SAE HADD subcommittee used Hyundai-created solid model to make surface of HPM-I shell from two, new, Technosports-calibrated manikins-- one scanned by Lear and the other by Toyota)
- Create shell only with torso line, thigh line and weight hanger line (Hardware is Next Project)
- Make manikin shell symmetrical

## ***Primary Objectives:***

1. Create Official SAE 3D CAD J826 HPM-I Model
2. Tighten Specifications to ***Improve the Accuracy and Reliability*** of the J826 HPM-I Physical and CAD Measurements

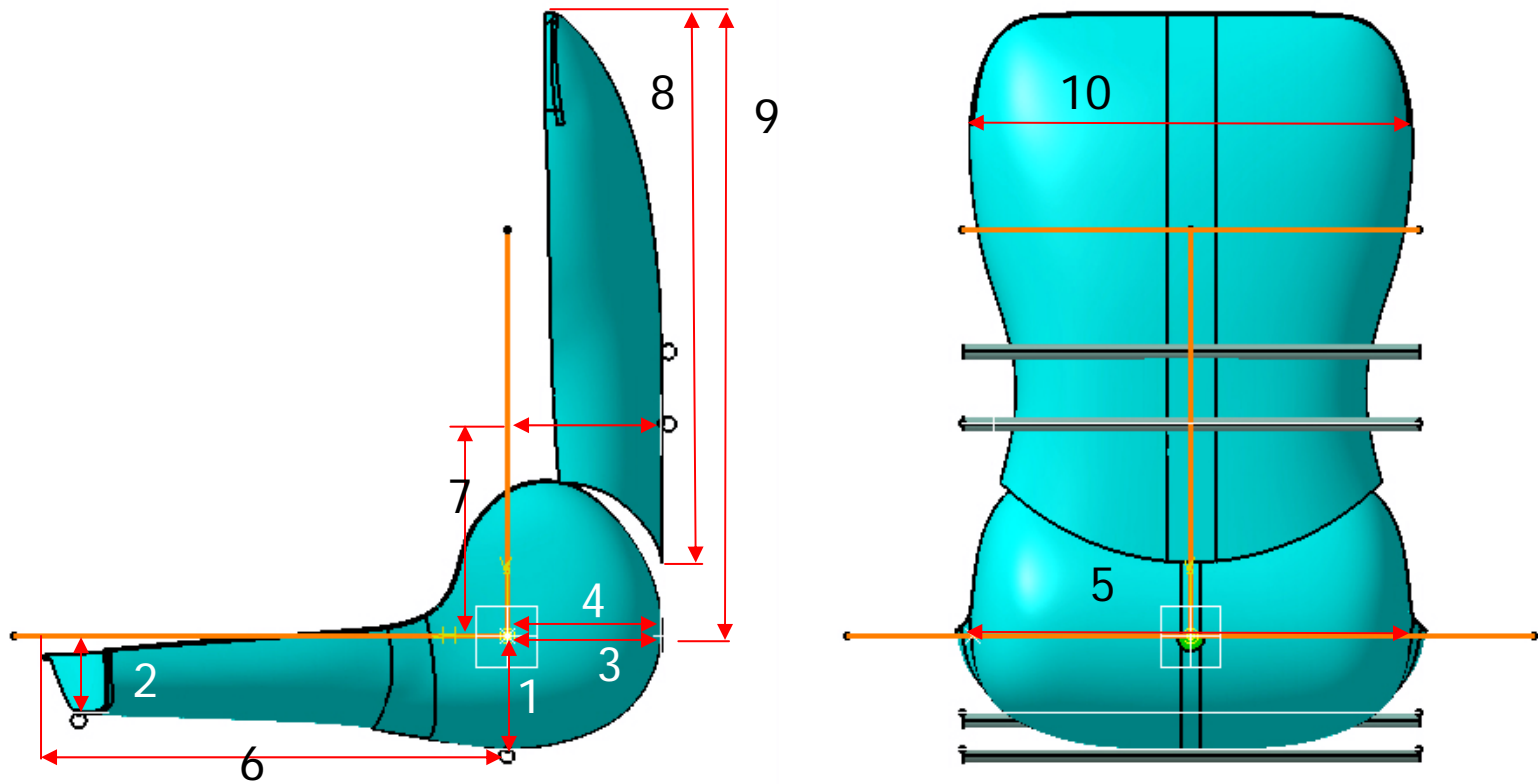
# Answers to Questions From GTR-7 Members

- **Q: SAE HADD Evaluation of VDA Proposal:** SAE J826 HPM-I CAD Model (When Completed) is (at this time) the only recognized model
- **Q: SAE HADD Plans (if any) to evaluate the effects of VDA proposal for ATD positioning:** HADD will request VDA in a letter (intended due date to send is 9/24/10) to request VDA share their HRMD, Manikin and Dilemma Models for HADD to Evaluate
- **Q: Any Comment on Legal Rights to Manikin Ownership:** SAE International is the only agency that can comment on legal ownership rights, licensing issues, integration into regulation or can recommend, endorse, or approve to adopt the VDA proposed manikin, HRMD, and Dilemma calibration fixture

# Relevant SAE J826 Manikin History

- Developed at GM late 1950's: became SAE test procedure 1962
- Manufacturer changed several times until 1989. Quality was poor from some manikins and some parts were not made according to the drawing
- From 1989 Technosports became sole and official manufacturer of J826. They reverse-engineered the shell molds from skins given to them by SAE through GM.
- GM also gave them assembly fixtures.
- SAE told Technosports to prioritize fixtures over assembly dwg's

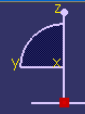
# Control Points for SAE J826 3D CAD Model



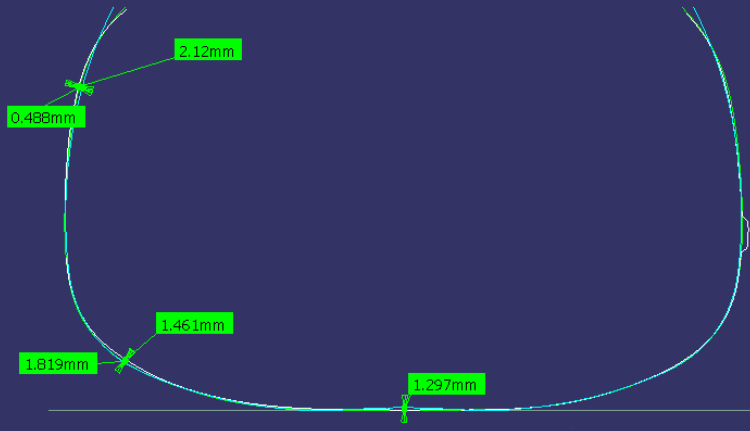
Used control points in fixture as control points for model + others

# Decisions made to Model SAE J826 3D CAD

- A) For the cushion pan symmetry, the left side was reflected (with some tweaking to match scans)
- B) For the Back pan, the right side was reflected (again with tweaking to match scans)
- C) We enforced some flat areas to the cushion and the back because we felt it improved the design while still matching the scan.



00x VDA & SAE are about 2mm Different



## Comparison:

VDA & SAE J826  
CAD Bottom Shell  
Models

**Good Match** between  
VDA & SAE Bottom  
Shell at 00x & 00z

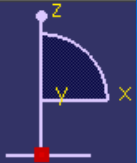
00z VDA & SAE are about 2mm Different



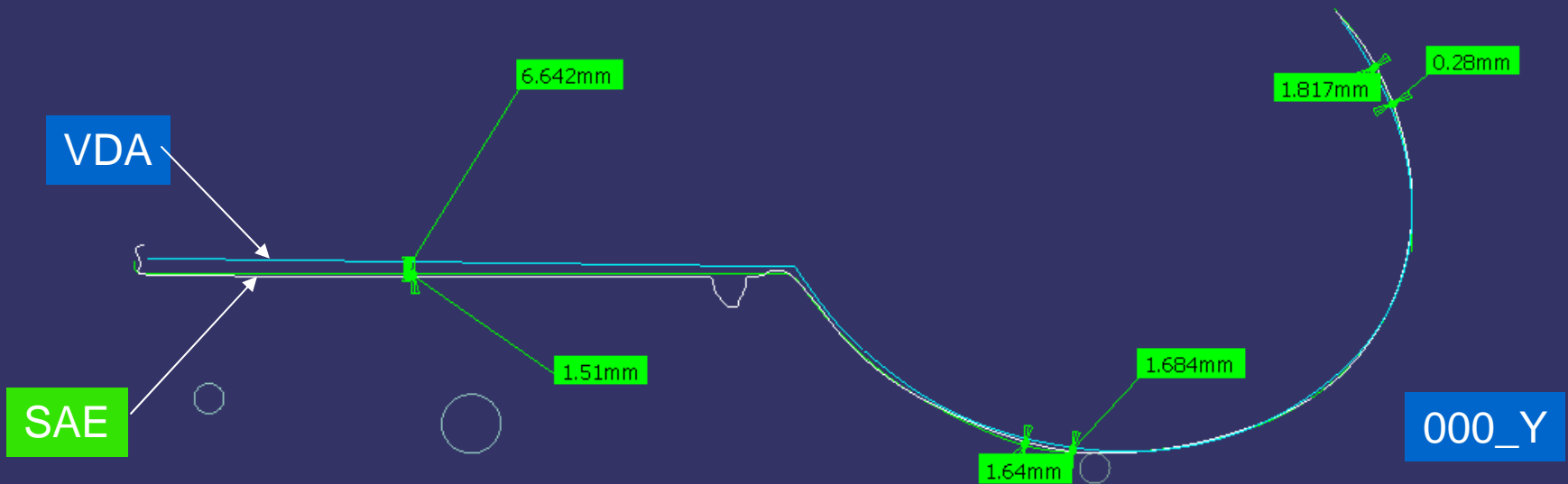


# VDA Bottom Shell Must be Rotated up 0.73 degrees to Equal SAE J826 Model

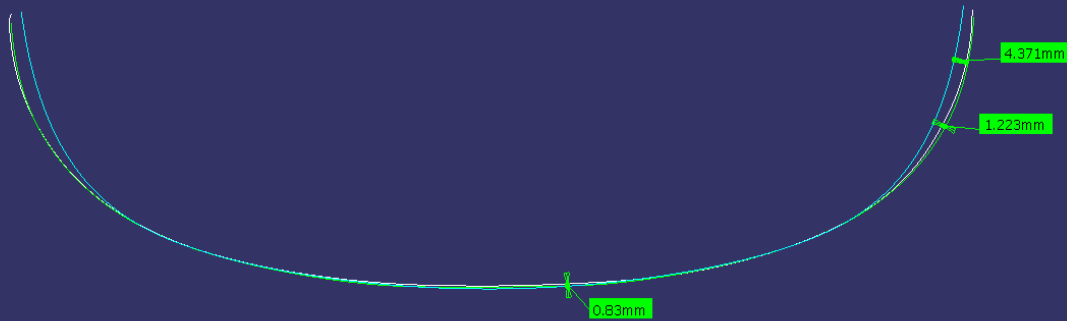
**Result:** Center Section of VDA is Higher than SAE



**Conclusion:** SAE & VDA Thigh Angles Measures will be Different



SECT 300Z VDA is **4.4mm Wider** than SAE



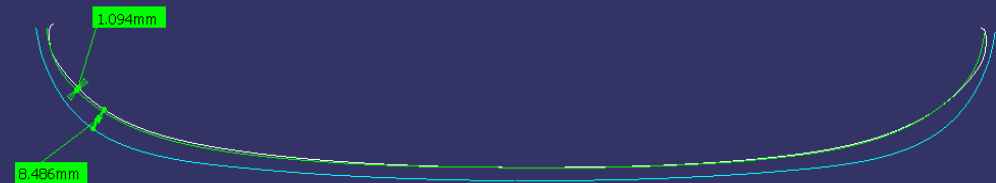
Comparison:

VDA & SAE J826 CAD  
Back Shell

Z Section Models

**Conclusion:** SAE & VDA Backs are similar up to 300Z *Then* VDA becomes increasingly Wider than SAE

SECT 500 Z VDA is **8.5mm Wider** than SAE



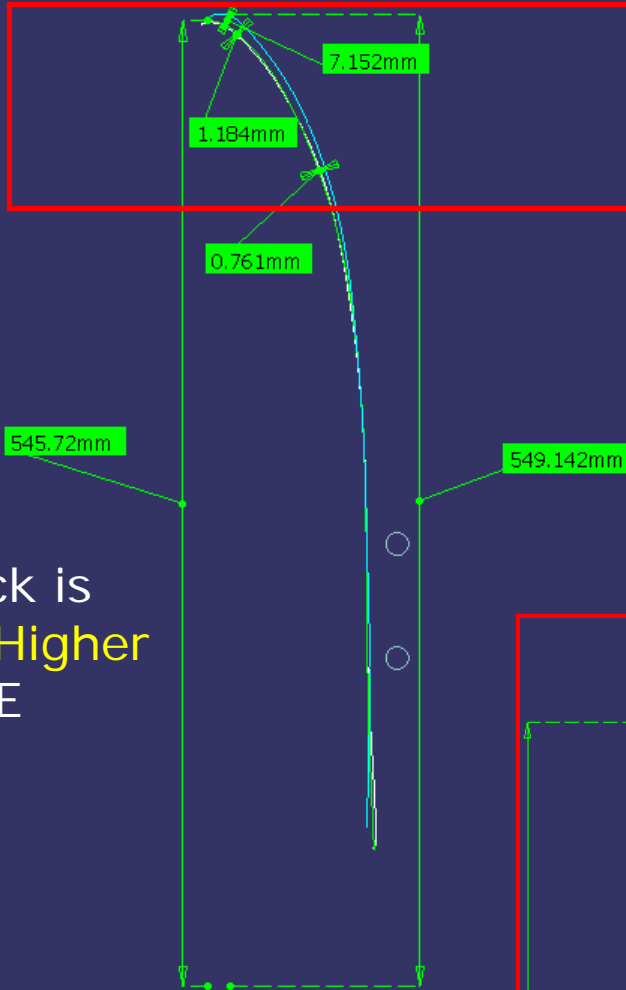
# Comparison:

VDA & SAE J826 CAD  
Back Shell  
X Section Models

SECT\_SECT\_0\_X

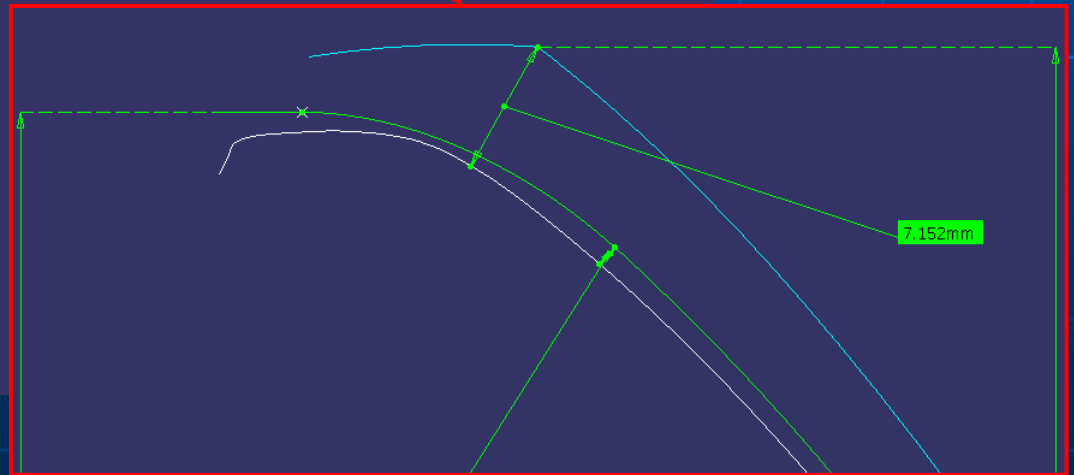
VDA

SAE



VDA Back is  
3.6mm Higher  
than SAE

VDA Back is 7.2mm Oblique  
X\_Z Rear than SAE



# Results

- New SAE Model matches scans within **1mm** in all key area and meets SAE J826 dimensional constraints
- VDA cushion orientation is different by  $\sim 0.73\text{deg}$  (lower at front); when aligned with SAE model
- VDA cushion model is close to SAE model in shape
- VDA Back model is considerably different in height and lateral back contour than the SAE model and scans.

**NOTE:** Comparison of SAE and VDA CAD Models is Ongoing so Measurement Differences between Models is Preliminary and May Change

# SAE J826 Recommendations

Improvements could be made to Technosports HPM-I fixtures to improve accuracy and ease of use

- 1) Front bar on cushion fixture should be moved rearward for better control of cushion angle
- 2) Add a second bar to orient back angle
- 3) New molds could be considered so they more accurately reflect J826 CAD

# Future Action—Short Term

- HADD Member companies are reviewing the J826 3D CAD model and will submit comments by 10/8/10 for discussion at the 8/20/10 HADD meeting
- Discuss GTR-7 feedback at HADD 10/20/10 meeting
- Share SAE HPM-I model with VDA and possibly discuss at 10/20/10 meeting

# Proposed (Near Future) J826 HPM-I Activities

- Surface inside of Cushion and Back Shells, add hardware and add reference lines for HRMD attachments
- Obtain HRMD CAD data from VDA and Discuss calibration values of SAE J826 HPM-I CAD Model
- Compare HPM-I CAD Model with 2d template and finalize the CAD 2d template by 3/11
- Edit J826 recommended practice to add calibration values of HPM-I and CAD Model

# Proposed Future J826 HPM-I & HPM-II Activities

- To Reduce Measurement Variability, HADD intends to Propose a Common J826 HPM-I and HPM-II, HRMD Backset Measurement Method (estimated) by 3/11



# *Thank You*

- Comments may be sent to

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